



B-waivers in Maryland: An Evaluation of Diagnostic Outcomes

**Maryland Department of Health and Mental Hygiene
Prevention and Health Promotion Administration**

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Center for TB Control and Prevention

TB Waiver Classification

- A – Active, Infectious pulmonary TB
 - Most TB cases are required to complete treatment before entry to the U.S.
- B1 – Noninfectious pulmonary TB
 - CXR consistent with TB, smears and cultures are negative
- B1 – Noninfectious extrapulmonary TB
- B2 – LTBI Evaluation needed
 - TST positive, CXR normal
 - Usually children under 15 years old
- B3 – TB contact evaluation





Maryland TB B Waiver Epidemiology

- 2008-2012:
 - TB case rate
 - 1,639/100,000 among B1 waivers
 - 664/100,000 among B2 and B3 waivers
 - Latent TB Infection rate
 - 45% diagnosed with LTBI (Class 2)
 - 43% among immigrants
 - 52% among refugees
- 2012-2015:
 - TB Case rate
 - 1,398/100,000 among B1 Waivers

Background

- Review of TB follow-up worksheets during data entry revealed:
 - Misclassifications of assigned outcome diagnoses
 - Insufficient test results to permit accurate diagnosis
- How much of a problem was this?
 - Decided to review the data to assess the degree of misclassification and incomplete US evaluation among B-waivers

Outcome Definitions

- Question D3 on TB follow-up worksheet
- D3. Diagnosis
 - Class 0 – No TB exposure, not infected
 - Class 1 – TB exposure, no evidence of infection
 - Class 2 – TB infection, no disease
 - Class 3 – TB, active disease
 - (Pulmonary, Extrapulmonary, Both sites)
 - Class 4 – TB, inactive disease

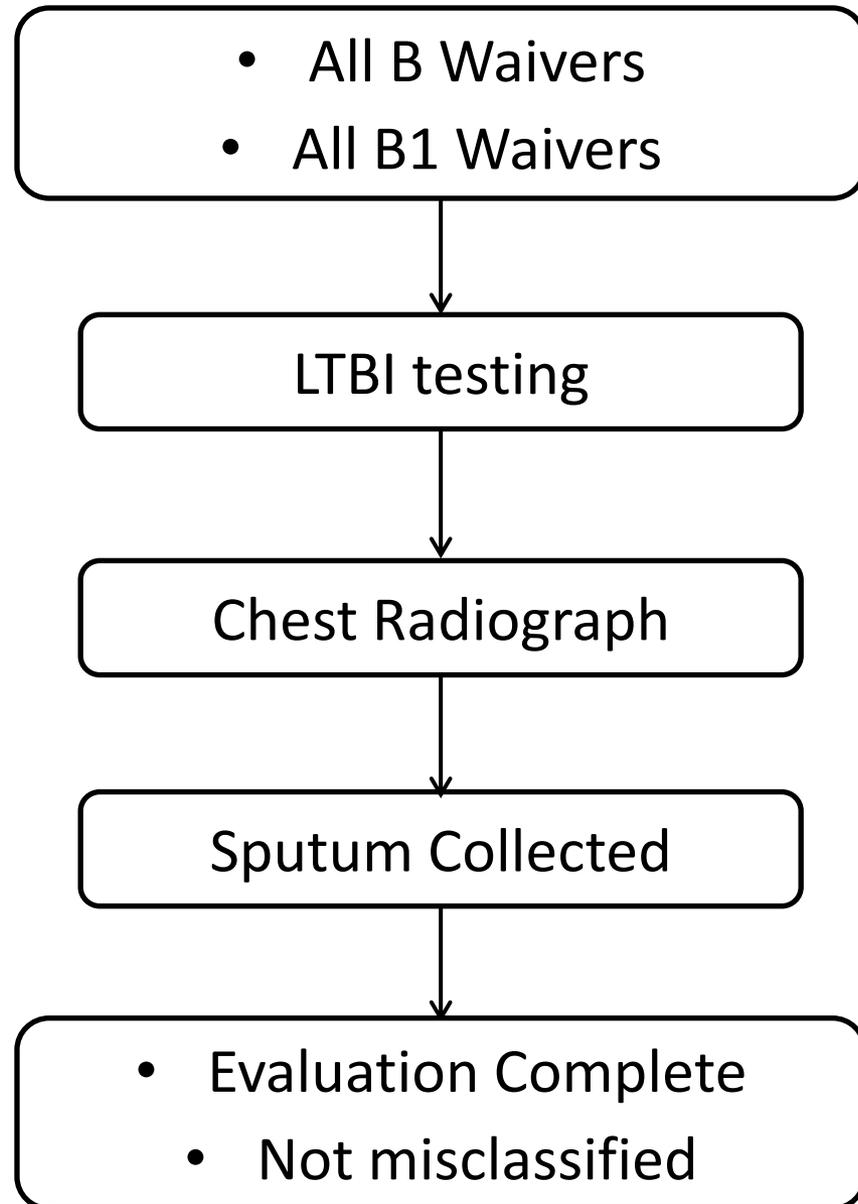
Study Definitions

- Misclassification: Patient test results did not meet CDC-defined criteria for the diagnosis assigned
- Incomplete evaluation: Patient history or test information was inadequate to permit a final diagnosis

Methods

- Study approach: Retrospective
- Study population:
 - All persons with a TB class B waiver
 - Arrived in Maryland between 2013-2014
 - Final outcome diagnosis was available
- Variables used for analysis:
 - Demographic information
 - Pre-immigration testing and treatment
 - US test results
 - Final outcome diagnosis
- Evaluated outcomes by diagnostic class:
 - Algorithm to assess for misclassification and incomplete evaluation

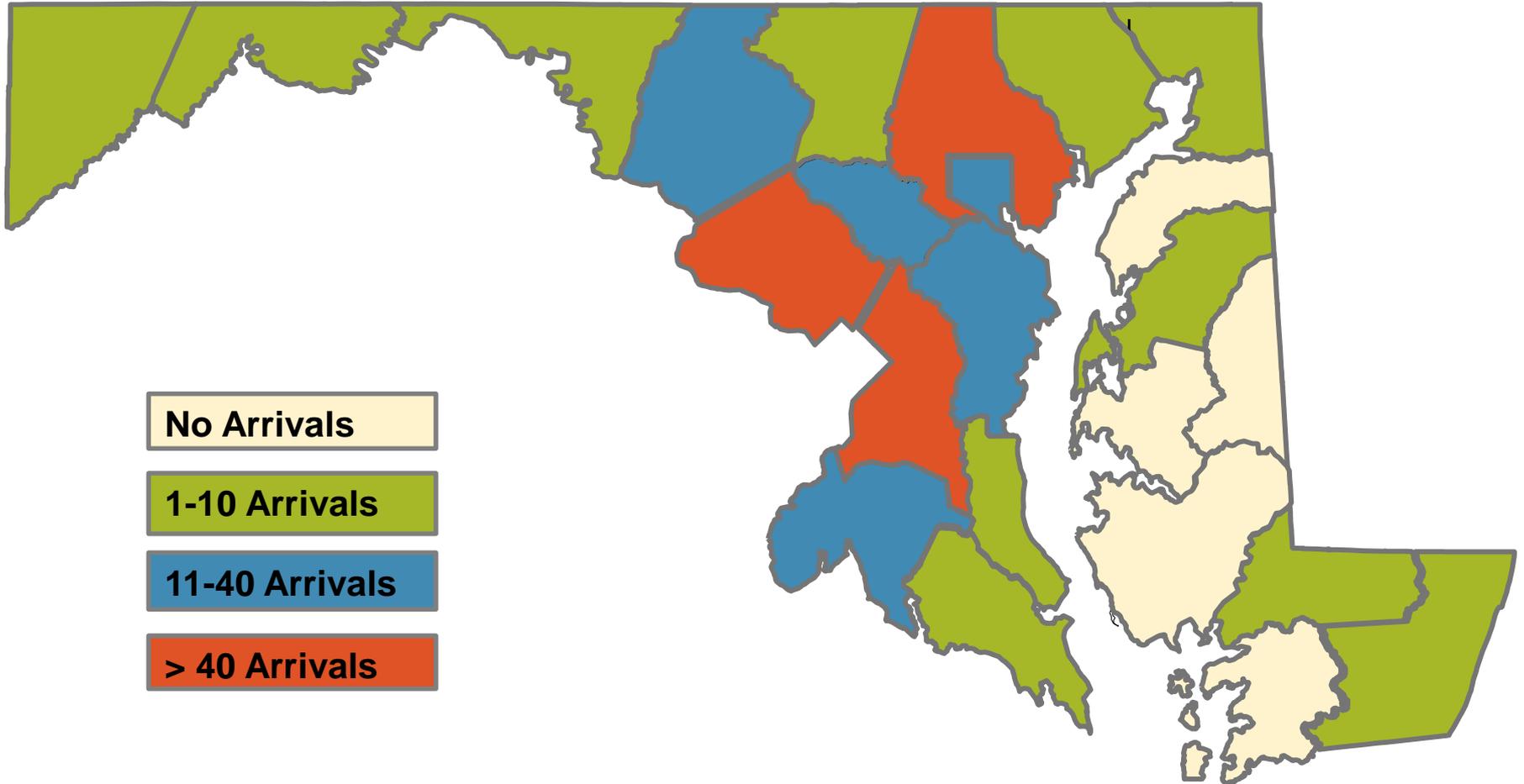
Methods Algorithm for Each Diagnostic Class



Results: Study Population

- 683 B-waiver arrivals to Maryland for 2013-2014 in EDN system
- 518 had an outcome diagnosis for analysis
 - B1: 317, 61%
 - B2: 191, 37%
 - B3: 7, 1.4%
 - Missing: 3, 0.6%

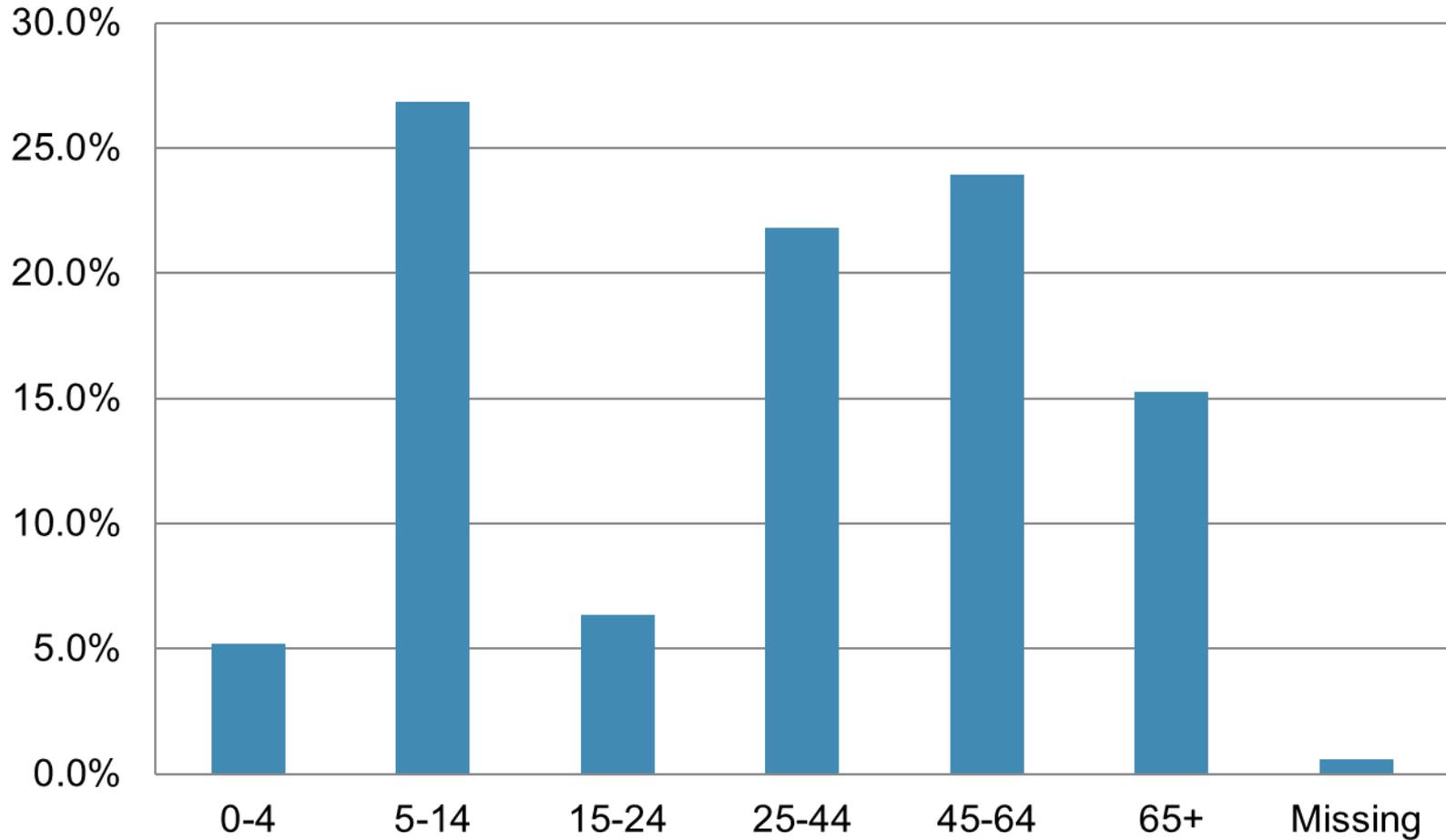
Maryland B Waivers 2013-2014



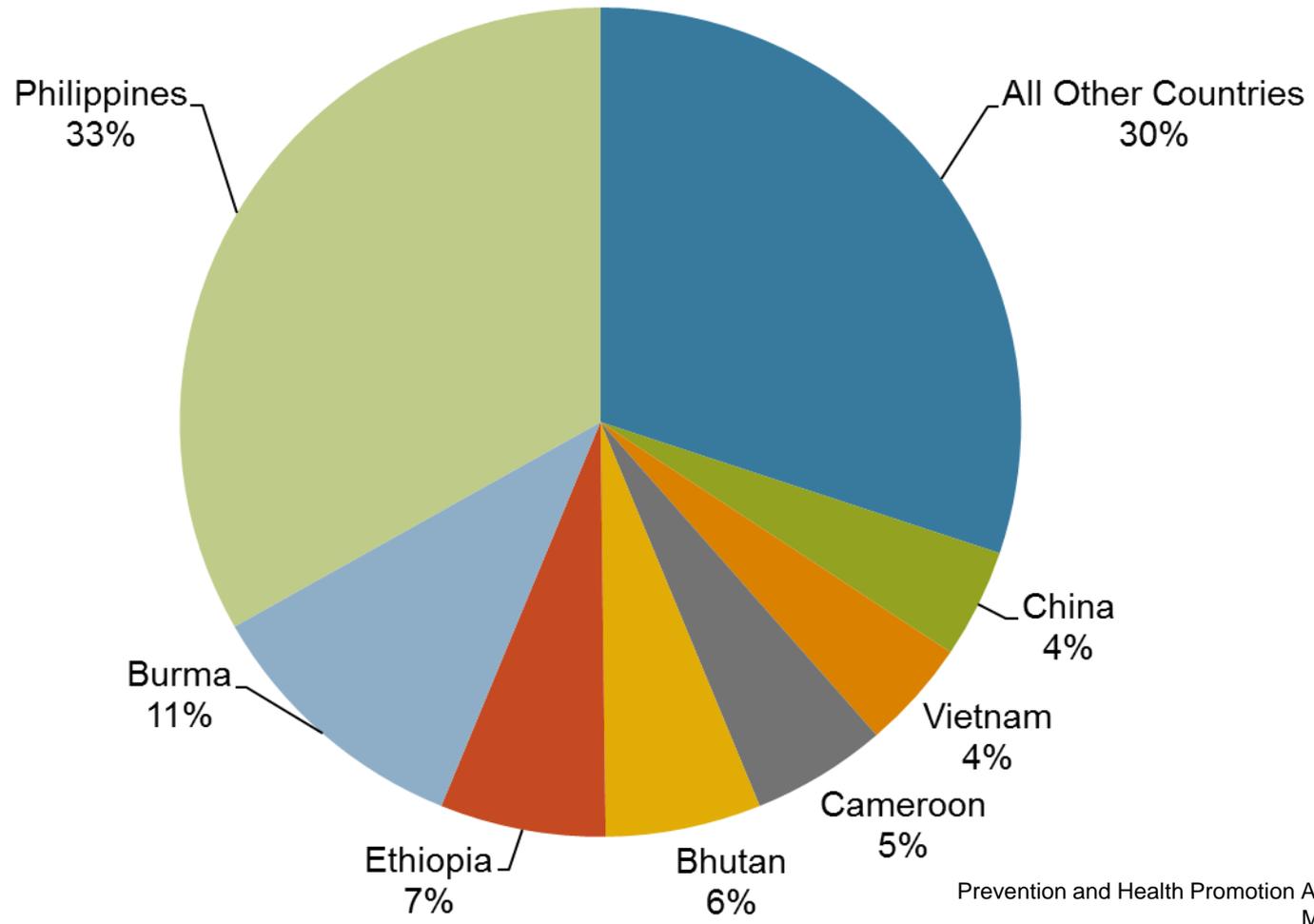
Sex: All B Waivers



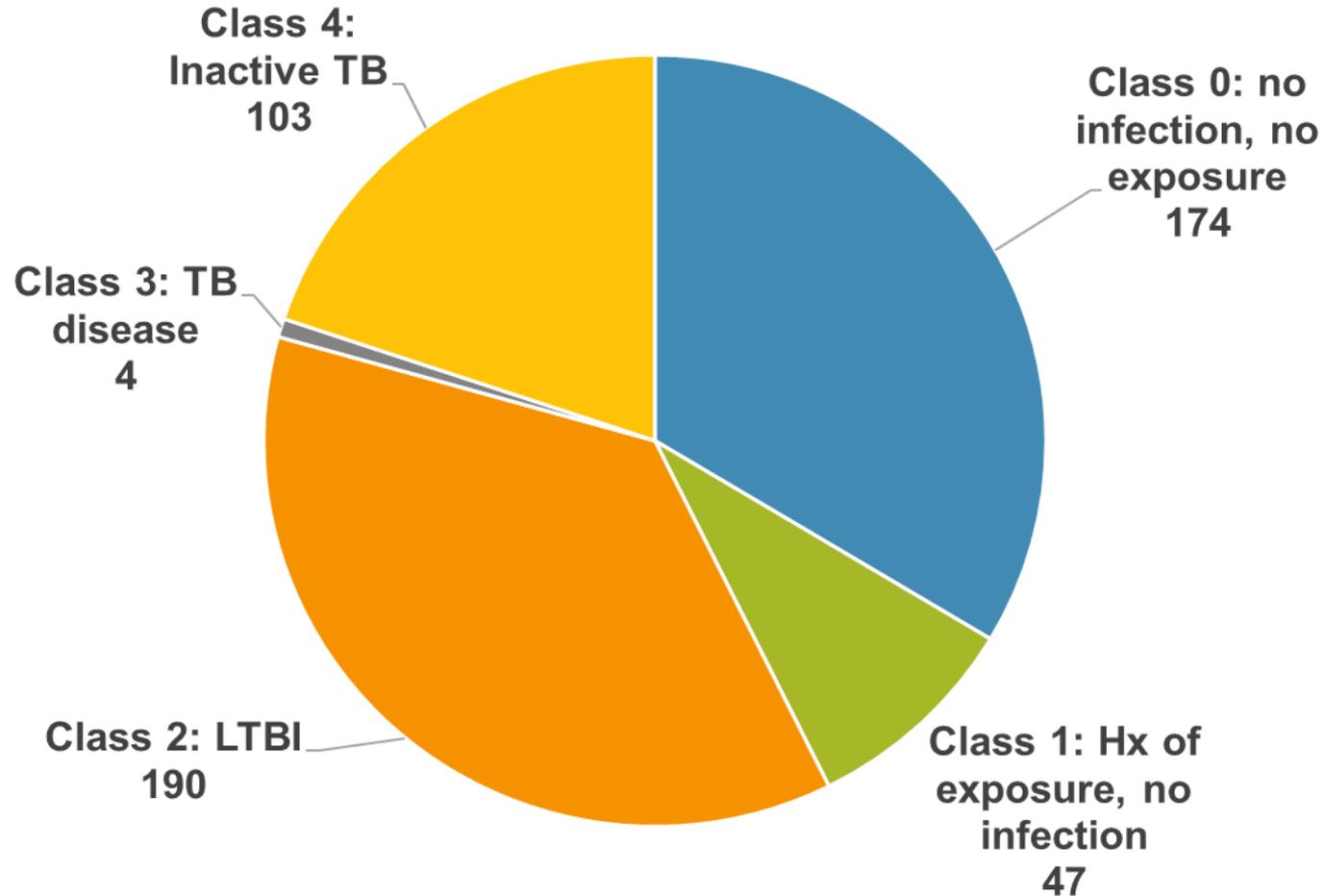
Age: All B Waivers



Country of Birth



Diagnostic Class





Results: Misclassification

All B Waivers					
Class 0 (n = 174)	Class 1 (n = 47)	Class 2 (n = 190)	Class 3 (n = 4)	Class 4 (n = 103)	Total (n = 518)
8 (5%)	14 (30%)	13 (7%)	0	3 (3%)	38 (7%)
B1 Waivers					
Class 0 (n = 103)	Class 1 (n = 30)	Class 2 (n = 89)	Class 3 (n = 4)	Class 4 (n = 91)	Total (n = 317)
4 (4%)	12 (40%)	10 (11%)	0	3 (3%)	29 (9%)

Results: Misclassification

All B Waivers					
Class 0	Class 1	Class 2	Class 3	Class 4	Total
(n = 174)	(n = 47)	(n = 190)	(n = 4)	(n = 103)	(n = 518)
8 (5%)	14 (30%)	13 (7%)	0	3 (3%)	38 (7%)
OR: 7.9, CI 3.7,16.7 for Class 1 (TB exposure, no infection) to be misclassified					
B1 Waivers					
Class 0	Class 1	Class 2	Class 3	Class 4	Total
(n = 103)	(n = 30)	(n = 89)	(n = 4)	(n = 91)	(n = 317)
4 (4%)	12 (40%)	10 (11%)	0	3 (3%)	29 (9%)



Results: Incomplete Evaluation

All B Waivers					
Class 0 (n = 174)	Class 1 (n = 47)	Class 2 (n = 190)	Class 3 (n = 4)	Class 4 (n = 103)	Total (n = 518)
23 (13%)	3 (17%)	37 (19%)	0	13 (13%)	76 (15%)
B1 Waivers					
Class 0 (n = 103)	Class 1 (n = 30)	Class 2 (n = 89)	Class 3 (n = 4)	Class 4 (n = 91)	Total (n = 317)
21 (20%)	3 (10%)	18 (20%)	0	9 (10%)	51 (16%)

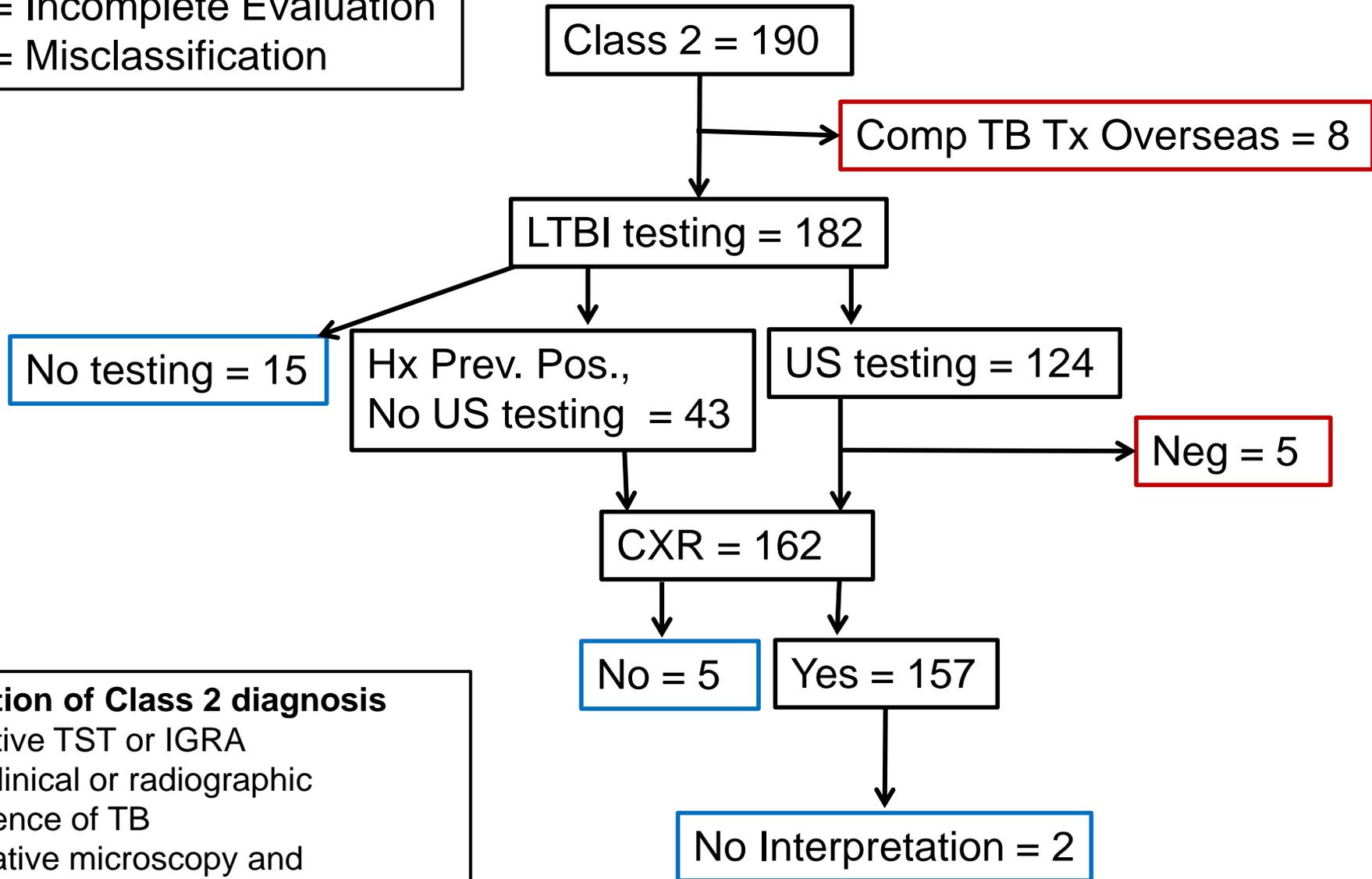
Results: Incomplete Evaluation

All B Waivers					
Class 0 (n = 174)	Class 1 (n = 47)	Class 2 (n = 190)	Class 3 (n = 4)	Class 4 (n = 103)	Total (n = 518)
23 (13%)	3 (17%)	37 (19%)	0	13 (13%)	76 (15%)
OR: 1.8, CI: 1.1, 2.9 for Class 2 (LTBI) to be incompletely evaluated					
B1 Waivers					
Class 0 (n = 103)	Class 1 (n = 30)	Class 2 (n = 89)	Class 3 (n = 4)	Class 4 (n = 91)	Total (n = 317)
21 (20%)	3 (10%)	18 (20%)	0	9 (10%)	51 (16%)

Key

 = Incomplete Evaluation

 = Misclassification

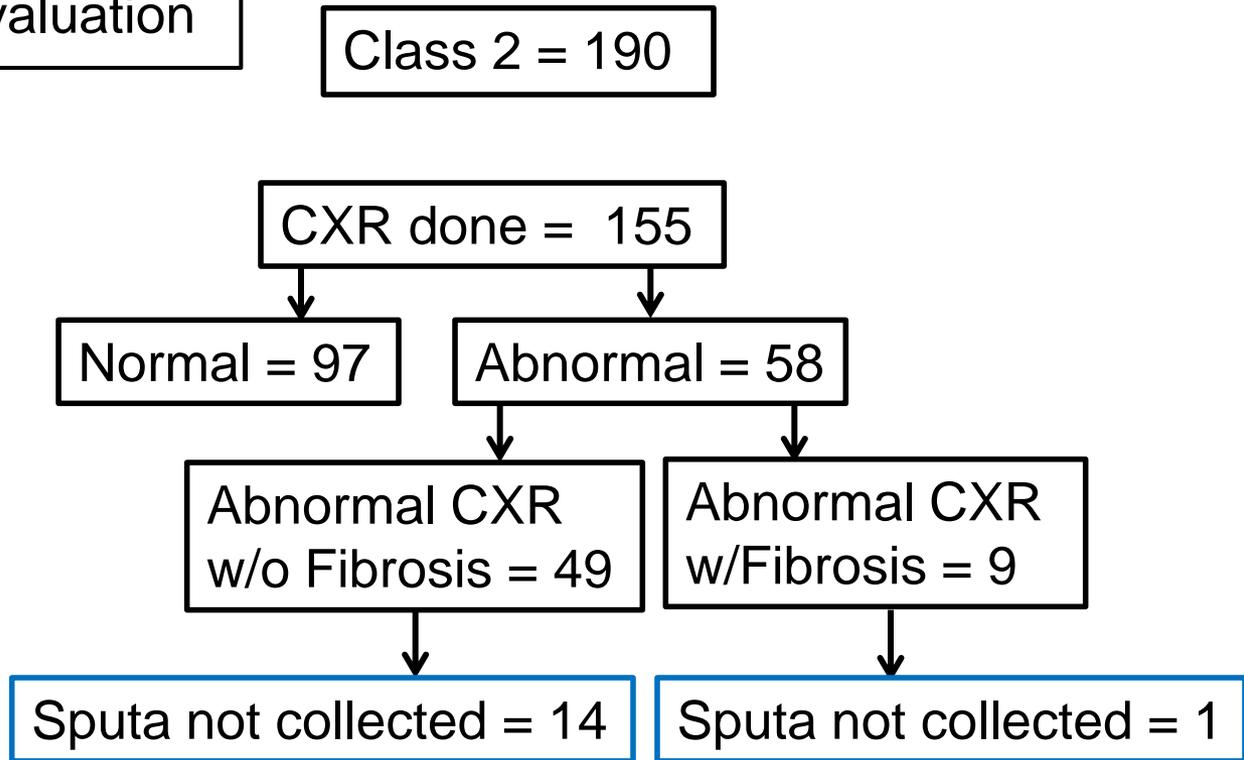


Definition of Class 2 diagnosis

- Positive TST or IGRA
- No clinical or radiographic evidence of TB
- Negative microscopy and bacteriology results
- No previous history of TB disease

Key

= Incomplete Evaluation



Definition of Class 2 diagnosis

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Limitations

- Chart reviews were not conducted which would have allowed for:
 - Assessing for the presence or absence of TB symptoms
 - Review of the chest radiograph report
 - Review for risk factors
 - Review of the Clinician notes
 - Document reporting errors on TB follow-up worksheet

Conclusions

- TB class B1 waiver arrivals were less likely than B2 or B3 waiver arrivals to be appropriately classified and evaluated (P=0.03)
- Among outcome diagnostic groups:
 - Patients diagnosed as **Class 1** (TB exposure, no infection) were less likely to be appropriately classified compared to patients in other diagnostic classes
 - Patients diagnosed as **Class 2** (LTBI) were less likely to be appropriately evaluated compared to patients in other diagnostic classes

Conclusions (cont'd)

- Resources developed:
 - Guidelines for evaluation steps for all arrivals with a TB class B waiver
 - Table to clarify definitions of CDC diagnosis classes



Prevention and Health Promotion Administration

<http://phpa.dhmh.maryland.gov>